

## REMARKS

Upon entry of the above amendment the claims will be 26 to 38.

The above amendment presents a new set of claims responsive to points set forth in the Official Action.

In this regard, the Official Action states that the claims are 1 to 23, however, as can be seen from the previous Official Action, the claims are 1 to 25.

Support for the present claims and correspondence between the present and previous claims will be seen from the attachment to this response.

Thus, new claims 26 to 38 correspond to previous claims 1 to 10 (Group I, previously elected for polymer compositions) and previous claims 20 to 23 (for adhesive compositions with these polymers). The features of previous claims 1 and 2 have been combined into new claim 26 and the formal objections have been attended to. The present claims do not employ the term "about".

This response will follow the same paragraph numbers as identified in the Official Action to comment on the rejections raised therein.

In Official Action paragraph 2, several terms have been rejected as indefinite.

In Official Action paragraph 2, the term "core arm(s)" is said to be indefinite. However, such term no longer appears in new main claim 26 but rather the term "core arm" which is defined with greater specificity.

With regard to the rejections in Official Action paragraph 2, new claim 26 has been amended to indicate that both the core and shell polymers are acrylic polymers.

The rejected phrase "and/or obtainable" is no longer present in the claims.

"Theoretical" has been deleted from previous claim 2 (part of new claim 26).

The term "branched copolymer" no longer appears in the main claim (26).

The catalyst used is now specified as a transitional metal in the main claim 26.

With regard to the rejection of "transition metal catalyzed radical polymerization" in claim 4 as indefinite, it is considered that one of ordinary skill in the art would recognize that the

transition metal serves as a catalyst for radical polymerization. It is not apparent in what respect this term would not be understood by one of ordinary skill in the art.

If the question is one of enablement, a rejection on indefiniteness is inappropriate.

In any event, it is clear that the present claims are fully enabled by the present specification.

With regard to Official Action paragraph 3, the rejected terminology no longer appears.

In Official Action paragraph 5, claims 1 to 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Matyjaszewski et al. (U.S. 5,763,548) or Goetz et al. (U.S. 6,583,223) each in view of Yuasa et al. (U.S. 6,326,116) or Ohba et al. (U.S. 6,534,229).

This rejection is respectfully traversed.

Starting with U.S. 5,763,545 (Matyjaszewski) = Maty

Maty addresses a very different problem from that of the present invention. The rejection provides no convincing reason a person wishing to prepare improved acrylic polymers useful as adhesives would start with Maty which is concerned with a ATRP process for making copolymers. As discussed in the present application (*see* paragraphs [0008], [0009] and [0010] of the U.S. application as published) there has been a technical prejudice in using controlled radical polymerization (CRP) to make adhesives. So a skilled person in the field of adhesives would have been deterred from starting from Maty.

In any event, why would a reader modify the processes described in Maty to make copolymers of a much larger polydispersity than those described in Maty? It is an object of Maty to control the molecular weight and polydispersity of polymers produced by radical polymerization by providing polymers of low polydispersity (see col. 3. lines 42 to 47). Such polymers would be unsuitable as adhesives which is only one of many reasons why a skilled person in the field of PSA would not start from Maty.

Thus a reader of Maty is taught directly away from using radical polymerization to prepare the polydisperse branched copolymers of the present invention. Why would a reader of Maty cross-reference other documents or features which directly contradict the teaching therein?

Combining Maty with US 6,326,116 (Yuasa)

The rejection has used impermissible hindsight to import a 'missing' feature of higher polydispersity into Maty from Yuasa without providing a credible reason why these documents would be combined. For the reasons already given, a reader of Maty would be actively deterred from reading Yuasa or modifying the polymers of Maty to have a higher polydispersity.

Yuasa is directed to toners which are not mentioned in Maty. Yuasa indicates that the method of polymerization is unimportant and the toner resins can be made by many conventional methods (see col. 16, lines 34 to 41). So in reverse, a reader of Yuasa would also have absolutely no reason to consult Maty and use the complex ATRP process described therein rather than conventional bulk polymerization (which is stated to be preferred). Yuasa teaches that mixture of polymers of both high and low molecular weight is desired for toner applications (e.g. see col. 3, lines 60 to 65) This provides a further disincentive to cross-reference Maty which is concerned only with a process for preparing polymers of low polydispersity.

Combining Maty with U.S. 6,534,229 (Ohba)

Ohba is in the same field (toner resins) as Yuasa and for similar to reasons to those above would not be cross-referenced by a reader of Maty.

Starting with U.S. 6,583,223 (Goetz)

For similar reasons to those above for Maty, a skilled person concerned with adhesives would not have consulted Goetz which is in an unrelated field of flow control agents where the polymer properties will be optimized for a different end use. It is a object of Goetz to provide copolymers of low polydispersity (for example see col. 2, lines 43 to 49). Any disclosure in Goetz of acrylic polymers made by ARTP does not overcome the technical prejudice against using this method to prepare copolymers with higher polydispersity such that they are suitable for use as adhesives.

Combining Goetz with U.S. 6,326,116 (Yuasa) and/or U.S. 6,534,229 (Ohba)

Similar arguments to those above show why a reader of Goetz (describing flow control agents of low polydispersity) would have little motivation to refer (separately or together) to either to Yuasa or Ohba which described toner resins.

The rejection also contends that various claims are then obvious over the above combinations of two references plus, in addition, a third reference. It will be appreciated that combining three documents must be inherently less plausible (i.e. non-obvious) than combining only two, but for completeness, see further arguments below.

Turning to Official Action paragraph 6, previous claims 20 to 23 have been rejected as obvious over the above cited combinations of references, plus U.S. 6,734,256 (Everaerts).

Everaerts is concerned with hot melt pressure sensitive adhesives (PSAs) which are block co-polymers prepared by radical polymerisation. However Everaerts teaches that it is preferred such block co-polymers are linear and not branched (see col, 7, lines 55 to 57) nor do these polymers have a core and shell structure. Furthermore, Everaerts teaches that the polydispersity of both each block and the overall polymer is no more than 2.0, preferably much closer to 1.0 (see col. 12, lines 37 to 45).

In any event, even if it would be reasonable for a skilled reader of Maty or Goetz who after cross-referencing Yuasa or Ohba then also consults Everaerts, this combination does not arrive at the present invention. The complete disclosure of Everaerts actually teaches away from the core/shell star polymers of the present invention so that the polymers of the earlier references would, if anything, be modified by the teaching of Everaerts to be even less like those of the present invention.

Turning to Official Action paragraph 7, claims 1 to 10 and 20 to 23 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ma (U.S. 5,721,330) in view of Ohba et al. (U.S. 6,534,229) and further in view of Tobing (U.S. 5,261,479).

Ma relates to macromonomers of high acid content which are used to synthesize structured copolymers such as graft copolymers.

In column 5, lines 5 to 17, they are also disclosed as dispersants, stabilizers, compatibilizers for polymer blends and binders in coatings such as aqueous photopolymer coatings.

Combining Ma with either Yuasa or Ohba and then adding any disclosure from Tobing is implausible. Tobing is concerned with improving the plasticizer resistance of certain PSAs. The

fact that Tobing describes polymers having a core shell structure does not make it likely that a reader of the combination of Ma plus either Yuasa or Ohba would simply import this feature when there is every reason (incompatibility/references in different fields) an art-skilled person would not have done so. The PSAs polymers described in Tobing are not prepared by transitional metal catalyzed radical polymerization and there is no suggestion in Tobing that this might be possible. Why therefore would a reader of Ma consult this document in an unrelated field?

The PSAs of Tobing are hot melt adhesives, and the toners of Yuasa or Ohba are very different. The polymers described in Ma could not be used as a PSA. The only reason one might combine these documents despite their technical conflicts is by using impermissible hindsight and foreknowledge of the invention.

Also starting with Goetz then either Yuasa or Ohba followed by Tobing makes no sense. Why would a skilled person (in any field) combine three documents in the three independent and unrelated fields of flow modifiers, toners and adhesives?

It is not at all apparent why one seeking to produce a PSA would combine Ma with any of the cited references for any purpose but certainly not the one presently recited.

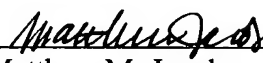
For the foregoing reasons, it is apparent that the rejections on prior art are untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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## CLAIMS

26. (first section from old claim 1 except where indicated) A branched polymer comprising an acrylic copolymer comprising at least one or more core arm(s) comprising at least one or more acrylic core polymer(s) and at least one or more shell arm(s) comprising at least one or more acrylic shell polymer(s) where said acrylic copolymer is obtained ~~and/or obtainable~~ by ~~(optionally transition metal catalysed)~~ radical polymerization and has a polydispersity of from ~~about 3 to about 10~~, and where (a) the ~~or each~~ core polymer(s) has a polydispersity of at least ~~about 2~~ and a  $T_g$  of from ~~about -65°C to about -20°C~~, and (b) the ~~or each~~ shell polymer(s) has a  $T_g$  of from ~~about 70°C to about 160°C~~;
- (second section from old claim 2, except where indicated) where the a branched polymer ~~as claimed in claim 1, which~~ is a star shaped thermoplastic elastomer acrylic block copolymer with a ~~theoretical~~ number average molecular weight ( $M_n$ ) of greater than 100 kilo daltons obtained by transition metal catalysed radical polymerization
27. (As old claim 3, except where indicated) A copolymer as claimed in claim 4 26, which is substantially free of a region obtained by an amine functional ethylenically unsaturated radically polymerisable monomer.
28. (As old claim 4, except where indicated) A copolymer as claimed in claim 4 26, which is obtained ~~or obtainable~~ by transition metal catalysed radical polymerisation.
29. (As old claim 5, except where indicated) A copolymer as claimed in claim 4 26, in which the core arms have a  $M_n$  of from ~~about 60 to about 250~~ kilodaltons, and the shell arms have an  $M_n$  of from ~~about 20 to about 80~~ kilodaltons.
30. (As old claim 6, except where indicated) A copolymer as claimed in claim 4 26, wherein the mass percentage of shell arms in the copolymer is from ~~about 10% to about 50%~~.
31. (As old claim 7, except where indicated) A copolymer as claimed in claim 4 26, wherein the polymer precursors from which the ~~all or a part of the~~ core arms are obtained ~~or obtainable~~ are monomers selected from the group consisting of: the

following monomers: C<sub>1-10</sub>alkyl acrylates, amyl acrylates, stearyl acrylate, lauryl acrylates, and/or mixtures thereof and/or derivatives thereof.

32. (As old claim 8, except where indicated) A copolymer as claimed in claim 4 31,  
 5 where the monomers are selected from the group consisting of: methyl acrylate, ethyl acrylate, n-propyl acrylate, isopropyl acrylate, n-butyl acrylate, tert.-butyl acrylate, sec.-butyl acrylate, isobutyl acrylate, amyl acrylate, hexyl acrylate, 2-ethylhexyl acrylate, octyl acrylate, nonyl acrylate, decyl acrylate, stearyl acrylate, lauryl acrylate and/or mixtures thereof.

10 33. (As old claim 9, except where indicated) A copolymer as claimed in claim 4 32, wherein the monomers are selected from the group consisting of: methyl methacrylate, ethyl methacrylate, tert.-butyl acrylate, cyclohexyl methacrylate, isobornyl methacrylate and/or mixtures thereof.

15 34. (As old claim 10, except where indicated) A copolymer as claimed in claim 4 26, wherein the core and/or the shell arms further comprise polymeric moieties obtained and/or obtainable from at least one or more monomers selected from the group consisting of: glycidyl methacrylate, tert-butyl (meth)acrylate, hydroxy  
 20 (meth)acrylates, styrene, and/or mixtures thereof and/or derivatives thereof.

35. (As old claim 20, except where indicated) An adhesive composition comprising a branched copolymer as claimed in any of claims 4 to 10 26 to 34.

25 36. (As old claim 21, except where indicated) An adhesive as claimed in claim 20 35, which further comprises from about 5 to about 150 phr of a tackifier, calculated by the weight of the copolymer.

30 37. (As old claim 22, except where indicated) An adhesive as claimed in claim 24 36, which comprises from about 25 to about 150 phr of a tackifier.

38. (As old claim 23, except where indicated) An adhesive as claimed in claim 20 35, which is selected from the group consisting of: a pressure sensitive adhesive or and a hot-melt adhesive.